Newsletter

University of Malaya-Kyoto University Secretariat

JSPS Asian Core Program
Research and Education Center for the Risk Based Asian Oriented Integrated Watershed Management

This program is funded by:

April 2015
Issue Vol. 5
12

*The 8th **Steering Committee Meeting (SCM8)** was held successfully at Miyako Sogo Jitsugyo High School, Okinawa, Japan on 27 January 2015. Nine participants from Malaysia and 14 participants from Japan attended the meeting.*

CONTENTS

Sharing the moment among the Malaysian and Japanese delegates during SCM8 field excursion at Higashiyama water farm pond one of the underground water reservoir in Miyako-jima, Okinawa, Japan (the arrival day, 26 January 2015). Insets above the photo are the graph on hydrological cycle of Miyako-jima, concept of underground dam applied in Miyako-jima and location of groundwater basins and underground dams in Miyako-jima.

University of Malaya-Kyoto University Secretariat is an international bilateral collaboration under:

UNIVERSITY OF MALAYA
SUSTAINABILITY SCIENCE CLUSTER

JSPS Asian Core Program
8th Steering Committee Meeting (SCM8)

27 January 2015

Miyako Sogo Jitsugyo High School, Miyako Island, Okinawa, JAPAN

On 27 January 2015 (Tuesday), the 8th Japanese Society for the Promotion of Science Asian Core Program Steering Committee Meeting (SCM8) was held at the Miyako Sogo Jitsugyo High School, Okinawa, Japan. The JSPS Asian Core Program is an international collaboration between Japanese and Malaysian universities under the research theme of "Research and Education Centre for the Risk Based Asian Oriented Integrated Watershed Management." The JSPS-ACP Steering Committee Meeting is a bi-annual event, with Kyoto University taking turns to organize the meeting. A total of 23 participants (14 Japanese and 9 Malaysian delegates) comprising the coordinators and group leaders, researchers and administrators attended the meeting. The participants:

Participants of Malaysian side:

Prof. *Nik Meriam Nik Sulaiman,* Coordinator, UM
Prof. *Zulkifli Yusop,* Leader of Group 1, UTM
Prof. *Md. Ghazaly Shaaban,* Leader of Group 2, UM
Prof. Dato' *Mazlin Mokhtar,* Leader of Group 3, Deputy Vice-Chancellor (Research & Innovation), UKM
Prof. *Salmaan Hussain Inayat-Hussain,* Member of Group 2 and 3, PETRONAS-UKM
Assoc. Prof. *Noor Zalina Mahmood,* Member of Group 4, UM
Ms. *Rozita Rosli*, Principal Assistant Director, MOE
Dr. *Nobumitsu Sakai,* Member of Group 1, 3 and 4, JSPS-UM
Mr. *Azizi Abu Bakar,* Research Officer, UM

Participants of Japanese side:

Prof. *Yoshihisa Shimizu*, Coordinator, KU
Prof. *Eiichi Nakakita*, Leader of Group 1, KU
Prof. *Minoru Yoneda*, Leader of Group 3, KU
Prof. *Masahisa Nakamura*, Leader of Group 4, Shiga University
Prof. *Hiroshi Kimura*, Member of Group 4, Konan University
Assoc. Prof. *Hiroshi Yamamoto*, Member of Group 3 and 4, The University of Tokushima
Dr. *Tadao Mizuno*, Member of Group2, KU
Mr. *Taishi Yazawa*, Doctor's Student, Member of Group 2, KU
Mr. *Takashi Kondo*, Master's Student, Member of Group 2, KU
Mr. *Daisuke Mizuochi*, Master's Student, Member of Group 2, KU
Mr. *Seiji Suzuki*, Director, Promotion of Science and Technology Division, KU
Ms. *Asako Koizumi*, Program-Specific Researcher, KU
Ms. *Sayo Kaneko*, Administrative Officer, KU
Ms. *Yuka Yano*, Administrative Officer, KU

During the meeting, JSPS Asian Core Program Coordinators from Japan and Malaysia, Prof. Yoshihisa Shimizu and Prof. Nik Meriam Nik Sulaiman delivered their opening addresses with an overall summary of past activities until January 2015. After a discussion on other matters, the meeting was adjourned and concluded with a gift exchange ceremony and photography session.

Photography session with the Miyako Sogo Jitsugyo High School Principal, Mr. Hideyuki Ishimine after greeting session in his office (27 January 2015)

Token of appreciation given by the ACP Coordinators; Prof. Nik Meriam Nik Sulaiman (University of Malaya) and Prof. Yoshihisa Shimizu (Kyoto University) to the school Principal, Mr. Hideyuki Ishimine as host for the SCM8.

(a & c) Steering Committee members during the SCM8 at Miyako Sogo Jitsugyo High School.
(b) Malaysian delegates in front of the school office.

Miyako Island Local Newspapers (28 January 2015):

地下水利用の現状視察

京大・マレーシア専門家ら 宮古総実高を訪問

京都大学大学院工学研究科付属の流域圏総合環境質研究センターの清水芳久教授やマレーシアのマレー大学のニック教授ら21人が27日、宮古総合実業高校（伊志嶺秀行校長）を訪れ、宮古島の地下水利用の現状や同校環境工学科の環境班が開発した「Bio-P（バイオ・リン）による地下水汚染対策などについて話し合われた。

訪問は日本学術振興会がアジアにおける世界的水準の研究拠点の構築を目指したアジア研究教育拠点事業の一環で「リスク評価に基づくアジア型統合的流域管理のための研究教育拠点」の形成に向け、マレーシアの総合的流域管理について研究・教育活動を行うため。

マレーシアは年間3000㍉程度の降雨があるが、河川の流れが比較的ゆっくりな事と、これまで人口増加が緩やかだったこともあり表流水のみの利用だったが都市部での急激な人口増

宮古の地下水利用について視察・研修するために京大大学院やマレーシアの大学から21人が訪れた＝宮古総合実業高校

地下水保全の取り組み視察

アジア型流域管理メンバー

きょう宮総実で研究発表

日本学術振興会のアジア研究教育拠点事業「リスク評価に基づくアジア型統合的流域管理のための研究教育拠点」形成に向けて研究・教育活動を展開している幹事会（日本側リーダー・清水芳久京都大学大学院工学研究科教授）マレーシア側リーダー・ニックマラヤ大学教授ら20人余

宮古総合実業高校の訪問であいさつするマラヤ大学のニック教授（左）＝27日、同校

MIYAKO SHINPO: *Technical visit of groundwater usage in Miyako-jima – Researchers from Japan and Malaysia Universities visited Miyako Sogo Jitsugyo High School*

MIYAKO MAINICHI SHINBUN: *Technical visit to groundwater conservation – Asian Core Program member: Research presentation at Miyako Sogo Jitsugyo High School today*

SCM8 Technical Visit:

During the first day of arrival at Miyako-jima (one of the Okinawa islands) on 26 January 2015, we paid a visit to underground dams control centre located at Fukuzato Dam. Miyako-jima has a unique water cycle where there is no river and lake because of the flat land feature (the highest elevation is 113 meter). The land consists of surface layer (Shimajiri merge) and Ryukyu limestone which are poor water retention, and Shimajiri mudstone is the bottom layer which is impermeable. About 40 percent of rainfall is infiltrated to the limestone layer and about 50 percent is evaporated. Therefore, the rain water available on the ground is quite limited and the local people suffer from frequent droughts. There was an extreme drought in 1971 and sugar cane industry was devastated due to the lack of water supply.

Since Okinawa prefecture was returned to Japan in 1972, groundwater investigations were initiated to solve the water issue. It revealed that there were underground basins because presence of geographical faults. Therefore, the underground dam by water cut-off wall was planned. A first water cut-off wall had been constructed at Minafuku Town in 1979 (**Figure 1**), and it effectively worked to retain the underground water. Therefore, Japanese government subsided further to construct more water cut-off walls. Two other water cut-off walls was constructed at Fukuzato and Sunagawa Town in 2000 (the construction period was 1987-2000). Thus, the underground dam enabled a stable crop production and increased crop yields. Two new underground dams were constructed (the construction period is 2009-2020) for dealing with increasing water demand and transferring the underground water to Irabu Island via Irabu Bridge. All of the underground dams are managed by a control centre located at Fukuzato Dam. **Figure 2** shows a control panel in the control centre. The green lamps are non-operated pumps, the yellow lamp is operated pumps and the red lamp is under maintenance. Most of the pumps were not operated since water demand is less during winter season. The underground water is pumped up to water farm ponds (there are 6 water farm ponds in Miyako-jima) and then transferred to agriculture lands via respective water pipelines by the gravity force. Water for domestic use: spring water is supplied to households after water treatment. In Miyako-jima, a slow sand filtration system is applied. At first, hardness of the ground water (280 mg/L) is reduced to 100 mg/L, and then it is transferred to the sand filtration. The low cost and easy maintenance filtration system is being applied by developing countries (*http://www.cultivate-inc.jp/youngpalm/priorlearning/docs/SodeyamaTreatmentPlant.pdf*).

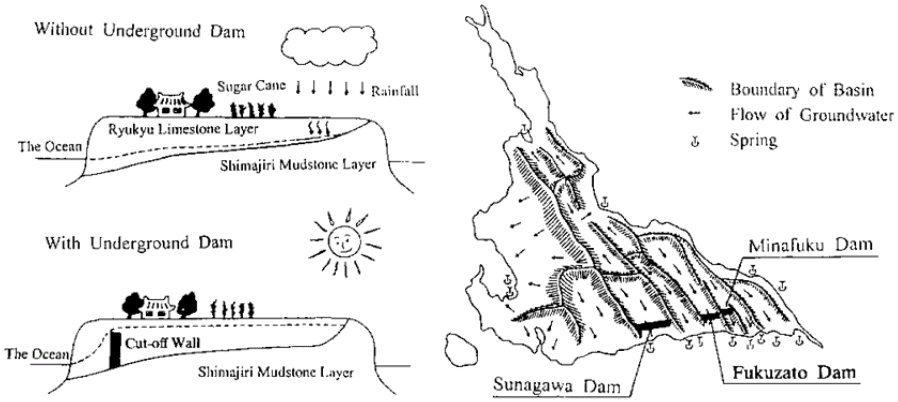


Figure 1 *Underground dam system (left) and location of groundwater basins and underground dams in Miyako-jima (right)*

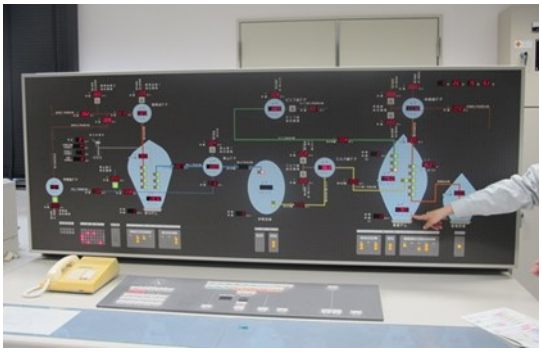


Figure 2 *Control panel of underground dams*

At Fukuzato Dam, there is a groundwater monitoring site with the water cut-off wall (**Figure 3**). The full water level in Fukuzato Dam is 46 meter, and the groundwater can overflow the wall when the water level exceeds 46 meter.

Figure 3 Groundwater monitoring site (left) and water cut-off wall (right)

A schematic diagram of the water cut-off wall is shown in **Figure 4**. The construction procedure is (1) Casing boring, (2) Advance boring with a single-shaft auger, (3) Cutting down the over flow section, (4) tri-axial boring and (5) *In-situ* churning. After these procedures, the dam crest which had been churned and hardened with grout can be observed (7 meter in depth from the ground). The construction site is going to be filled with soil and returned to the original condition.

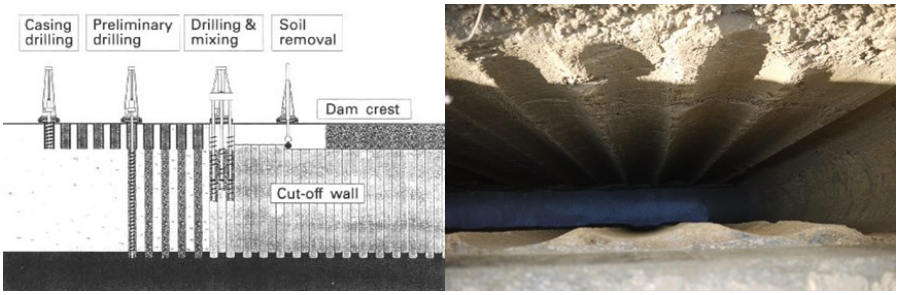


Figure 4 Construction procedure of water cut-off wall (left) and dam crest after *in-situ* churning with grout (right)

Figure 5 shows the Higashiyama water farm pond. The designed scale is 60 meter in diameter and 10.9 meter in depth. The water level during the visit was 8.6 meter in depth which is equivalent to 113.6 meter above sea level.

Figure 5 The Higashiyama water farm pond (left) and water level gauge (right)

On 28th January 2015, we visited a sugarcane farm and sugarcane refinery factory; Okinawa Seitou Co. Ltd. Mr. Sunagawa uses an organic fertilizer "Bio-P" which was invented by Mr. Maesato and his environmental team in Miyako Sogo Jitsugyo High School. His sugarcane production is excellent compared to other farms using chemical fertilizer.

***(a)** Mr. Sunagawa (left) and his sugarcane farm, and Mr. Maesato (in green outfit), a teacher in Miyako Sogo Jitsugyo High School. **(b)** Type 21 (yellowish) and Type 27 (reddish) sugarcane of Mr. Sunagawa's farm.*

The sugarcane used the Bio-P grows much taller than those used chemical fertilizer. It grows to 4 meter in height. The yield in Mr. Sunagawa's farm is 13-14 tonne/year which is almost double than other farms (~7 tonne/year). Furthermore, it becomes sweeter. The sugar content in his farm becomes 15.5, which is considerably higher than average sugar content (~12.2). The sugarcane farmers experience problems with pests which eat buds of sugarcane. Therefore, they use UV lights to attract a pest (*Anomala albopilosa*). Also, at a period of sowing sugarcane seeds, they use a pesticide (Princebait) to prevent another pest (*Spinochordodes tellinii*). The incentive of using the Bio-P is 1300 JPY/tonne/sugar content. In case of Mr. Sunagawa's farm, the surplus yield compared to the average is 7 tonne/year and the surplus sugar content compared to the average is nearly 3 tonne/year. Therefore, the annually margin is calculated: 1300 JPY/tonne/sugar content x 7 tonne/year x 3 sugar content = 27300 JPY. In addition, the Bio-P costs 300 JPY/15kg. Compared to chemical fertilizer which costs 2000 JPY/20kg (it used to cost 1100 JPY/20kg, but it has become costly due to a decreasing resource of phosphorus), which is cheaper.

However, the low price is due to no labour cost as high school students are producing the organic fertilizer as part of their practical activities. If the bio-P is produced by private company, the cost would be higher than the chemical fertilizer. Also, the Bio-P-fertilized land needs more management works compared to the chemical fertilizer. That is why some farmers still prefer to use the conventional chemical fertilizer to avoid the additional manual works. To facilitate the Bio-P further, there are a lot of issues to be addressed such as to secure resources for the Bio-P (*i.e.* bagasse and its charcoal, molasses and MB-22), to reduce the production cost by company as well as subsidize by local government, to increase awareness of farmers in terms of environmental conservation *etc*. In addition to the Bio-P, Mr. Maesato and his team developed another approach to utilize the unavailable phosphorus. Sugarcane production takes 1.5 year and the rest of the half year used to be an off season. Therefore, they proposed to grow *Soba* (buckwheat) during the season as *Soba* can be harvested within a few months. By the *Soba* production as a second crop, the remained fertilizer on the farm yard is efficiently used so that the groundwater pollution can be prevented. According to Mr. Maesato's team, it has been also proven that the *Soba* production could contribute to CO_2 reduction by its photosynthesis. Furthermore, farmers can gain more income and even their awareness towards environmental conservation would increase. Now, the local people addresses further *Soba* production to make it as local goods.

***(c)** Master of Soba noodle (people of Miyako-jima) **(d)** Chiffon cake made with Soba*

Cooperative Research Program (CRP): Hydrological Studies to Evaluate Ecosystem Changes in Selangor River Watershed

3 - 6 March 2015

Kyoto University, JAPAN

Dr. Amalina Muhammad Afifi
Department of Mechanical Engineering,
Faculty of Engineering,
University of Malaya,
50603 Kuala Lumpur, Malaysia

Ms. Nurnadhiah Nadhirah Che' Abas
Department of Mechanical Engineering,
Faculty of Engineering,
University of Malaya,
50603 Kuala Lumpur, Malaysia

Introduction and Objectives

A research visit entitled 'Hydrological Studies to Evaluate Ecosystem Changes in Selangor River Watershed' to Kyoto University under Asian Core Program took about four days (3-6th March 2015). The purpose of this research visit is to learn and gain fruitful experience besides obtaining new knowledge regarding hydrology and ecosystem and its interrelationships in between. Mainly, we have three objectives to accomplish during the research visit, namely as below:

- To understand and apply the methods used by the students
- To learn the suitable hydrological modelling to evaluate the future scenario pertaining to ecosystem and land use changes
- To discuss and seek advice from the experts regarding our research project.

Date	Activities
2nd March 2015	Arrival in Kyoto, Japan
3rd March 2015	Discussion with Professor Shimizu at Research Center of Environmental Quality Management, Otsu
4th March 2015	Discussion with Professor Yoneda, A. P. Dr. Kurata and A. P. Nishimura at Katsura Campus
5th March 2015	Leisure and sightseeing around Kyoto
6th March 2015	Discussion with Professor Nakakita and Dr. Yamaguchi at Uji Campus
7th March 2015	Departure to Kuala Lumpur, Malaysia

Fruitful first day of research visit with Prof. Shimizu, Ms. Osada, Mr. Yazawa and Mr. Mizuochi in front of Research Center of Environmental Quality Management, Otsu.

Messages from Supervisor
(*Dr. Amalina Muhammad Afifi*)

Urbanisation cause rapid changes of land use. Sungai Selangor is one of the watersheds that provides water supply to the Klang valley community. Land use changes at the Sungai Selangor and its vicinity are such as conversion of forests to agricultural land, housing areas, industrial areas, and highways. Various land uses or land use changes at the watershed may cause problems of water shortage or more/ bigger flood occurrence in the future besides affecting the ecosystem including flora, fauna, or other community that depend on the river. Our research aim is to estimate the ecosystem changes as well as flood occurrence at Sg. Selangor area based on the land use changes by using GIS and SWAT model. The study will hopefully provide information to aid decision making in long term land use planning to protect water resources, and to mitigate the effects of water scarcity and flooding.

Remarks

"I would like to express my sincere gratitude and appreciation to all those who were involved in this research visit. A special thanks to my supervisors Dr. Amalina Muhammad Afifi and A. P. Faridah Othman. I would also like to acknowledge Asian Core Program, University of Malaya, Kyoto University, Professor Yoshihisa Shimizu, Prof. Dr. Nik Meriam and ACP Secretariat – Mr. Azizi for giving me this lucky opportunity to visit Kyoto University. To all of the researchers visited during our temporal stay, thank you so much for kindly spent some time with us and shared various perspectives and experiences regarding environmental studies. Not forgetting my Japanese friends, Ms. Chiemi Osada, Ms. Yu Kawata, Mr. Taishi Yazawa and Mr. Daisuke Mizuochi, my deepest appreciation towards your warm hospitality and guidance throughout the research visit. Arigatou gozaimasu!"

The list of names of the collaborated experts are:

- Professor Yoshihisa Shimizu, Dr. Naoyuki Yamashita, Ms. Chiemi Osada, Ms. Yu Kawata and Mr. Taishi Yazawa from Research Center for Environmental Quality & Management (RCEQM)
- Professor Minoru Yoneda and Assoc. Prof. Dr. Yoko Shimada from Environmental Risk Analysis
- Assoc. Prof. Dr. Gakuji Kurata from Atmospheric and Thermal Environmental Engineering Laboratory
- Assoc. Prof. Dr. Fumitake Nishimura from Water Quality Engineering
- Professor Eiichi Nakakita and Dr. Kosei Yamaguchi from Disaster Prevention Research Institute (DPRI)

Results and Discussion

Based on the 3-days visit to Kyoto University, this research visit produced many inputs and was beneficial in many aspects. On day 1, we did some discussion with Professor Shimizu and RCEQM lab members. The presentations conducted by Ms. Chiemi Osada, Ms. Yu Kawata and Mr. Taishi Yazawa have given us some ideas and brief guidelines on the methodologies used to conduct our research project. Ms. Kawata presented about the water quality and quantity prediction during dry and wet season using Soil Water Assessment Tools (SWAT) model for Langat River, Malaysia. Ms. Osada also used SWAT model to analyse pollutant runoff in Johor River, Malaysia. Meanwhile, Mr. Yazawa used HSPF model to conduct runoff simulation in Johor River, Malaysia using GIS-based watershed model. They also shared some information about GIS, SWAT and HSPF model. Then, Dr. Yamashita presented 'Ecotoxicology Evaluation of Antibiotic Employing Battery of Aquatic Organism Bioassay'. From the presentation, we understand about the effects of antibacterial agents such as Levofloxacin (LFVX) and Clarithromycin (CAM) on bacteria, algae and crustacean.

On day 2, we visited Katsura Campus to meet with Professor Yoneda and A. P. Dr. Shimada. They elaborated about some of their projects regarding toxicology and environmental risks. They also kindly brought us for their laboratories tour. We were so lucky to be given this opportunity to be able to see the interesting laboratories including the radioactive ones. Later on, Dr. Kurata explained about the Iskandar Malaysia project in collaboration with UTM. He also briefed about some of the projects on outdoor and indoor atmosphere pollution in China and India. Soon after the meeting with Dr. Kurata, we met A. P. Dr. Nishimura to discuss about water pollution mechanism and water treatment technologies. He also introduced about his research works on nitrogen behavior during sludge ozonation and changes of microbial substrate metabolic patterns through a waster reuse processes.

During the final day, we attended a meeting with Professor Nakakita and Dr. Yamaguchi at Uji Campus. A presentation entitled 'Recent Activities related with Weather Radar in DPRI' was presented by Dr. Yamaguchi on behalf of Professor Nakakita. From the presentation, we learned about the localized heavy rainfalls in Hiroshima and the torrential rainfall at Toga River in 2008. We then assumed that the recent major flood in Kelantan, Malaysia may be because of similar factors as in Toga River. Dr. Yamaguchi also introduced video-sonde equipment to us. The shape was rectangular with a balloon attached, it was released in the atmosphere to indicate the weather data. The video demonstration was very interesting to watch because such method may not be practiced yet in Malaysia.

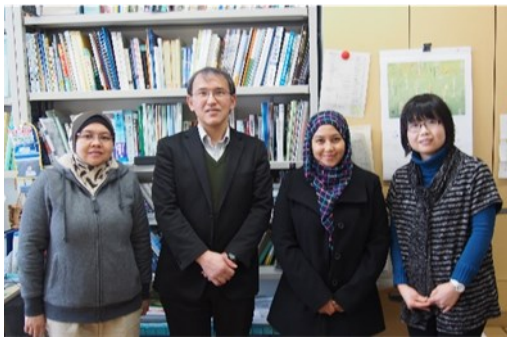


Photo taken after discussion with Professor Minoru Yoneda and Associate Professor Yoko Shimada during our visit to Katsura Campus.

Visited and discussed with Associate Professor Fumitake Nishimura at Katsura Campus.

Visited and discussed with Associate Professor Gakuji Kurata at Katsura Campus.

Visiting Dr. Kosei Yamaguchi at Uji Campus on the final day of research visit.

Conclusions and Future Plan

The research visit to Kyoto University was indeed very fruitful and beneficial towards our research work. Hence, we aim to apply the methods, techniques and skills such as GIS and SWAT model to be implemented in a research project related to ecosystem and land use changes with respective to hydrology at Selangor River in the near future.

Local Concentration of Linear Alkyl Benzene Sulfonate Emitted from Laundry Detergent in Two Major Rivers

Selangor and Langat River, MALAYSIA

Dr. Yasuto Matsui
Graduate School of Engineering,
Kyoto University

Mr. Junichi Shirasaka
Graduate School of Engineering,
Kyoto University

Introduction and Objectives

Linear alkyl benzene sulfonate (LAS) is one of the anionic surfactants and commonly used as detergents for laundry and/or kitchen all over the world. The surfactant has both a hydrophilic group and a hydrophobic group in the molecules so that is able to wash oil with water and remove stain. LAS is classified by four kinds of surfactants according to the chemical structure: anionic, cationic, amphoteric and non-ionic surfactant. The sulfonate group is situated at para position of the alkyl group which generally consists of 10–14 carbon chains. The attachment of the phenyl group to the alkyl carbons occurs at any interior alkyl carbon, and the phenyl position is referred to as the carbon number. And it is known that the toxicity of LAS is weaker so that the length of the alkyl chain and stronger so that the length of the alkyl chain.

It is suggested that LAS causes adverse effects to human and/or animals since there are numerous scientific findings of acute, chronic, hereditary and reproductive toxicity. On the other hand, LAS is biodegradable in the environment and rapidly decomposed into water and carbon dioxide by microorganism. Therefore, LAS is a key indicator that sewage is discharged into drainage or river without treatment if it is detected in the environment. There are few studies on LAS in Malaysia river basin. As Klang Valley becomes more and more populated and sewer line has not been connected enough, LAS pollution may emerge significantly in this region. Therefore, the objective of the study was to collect surface water in Langat and Selangor river basin and analyse LAS concentration for clarifying pollution status of LAS and identifying pollution source.

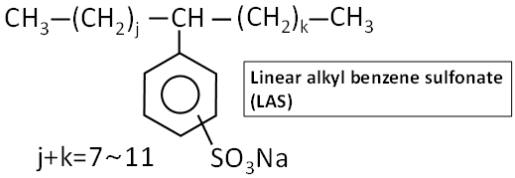


Fig. 1 Linear alkyl benzene sulfonate (LAS)

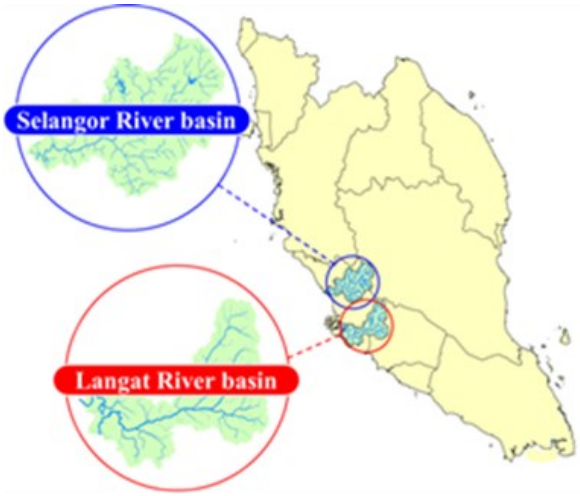


Fig. 2 Langat and Selangor river basin

Messages from Supervisor (*Dr. Yasuto Matsui*)

Mr. Junichi Shirasaka was engaged in another research theme before entrance of graduate school. He constructed simulated short length flow in our experimental room and artificial river water was injected to the flow path. Concentration of dissolved oxygen, nitrogen, phosphorus and other water quality index were measured and simulate a relationship between these concentrations and detention period to a bottom sledge. Dr. Nobumitsu Sakai created an opportunity to investigate an actual river basin in Malaysia. It is thought that economic growth and improvement of life quality is the major cause of the increase of detergent compound concentration in river. We focused on surfactant, especially Liner Alkyl Benzene Sulfonate from daily use and started a screening investigation at the end of rainy season.

They both were more than eager to collect a few dozen of river water samples in two major river and performed a solid extraction in each samples within a short period. They caught a contamination tool and chemical in a process of sample preparation and construct a method of low level quantitative analysis. I was impressed by their motivation and I believe that they will carry through with the investigation through a great GCOE-UM relationship.

Results and Discussion

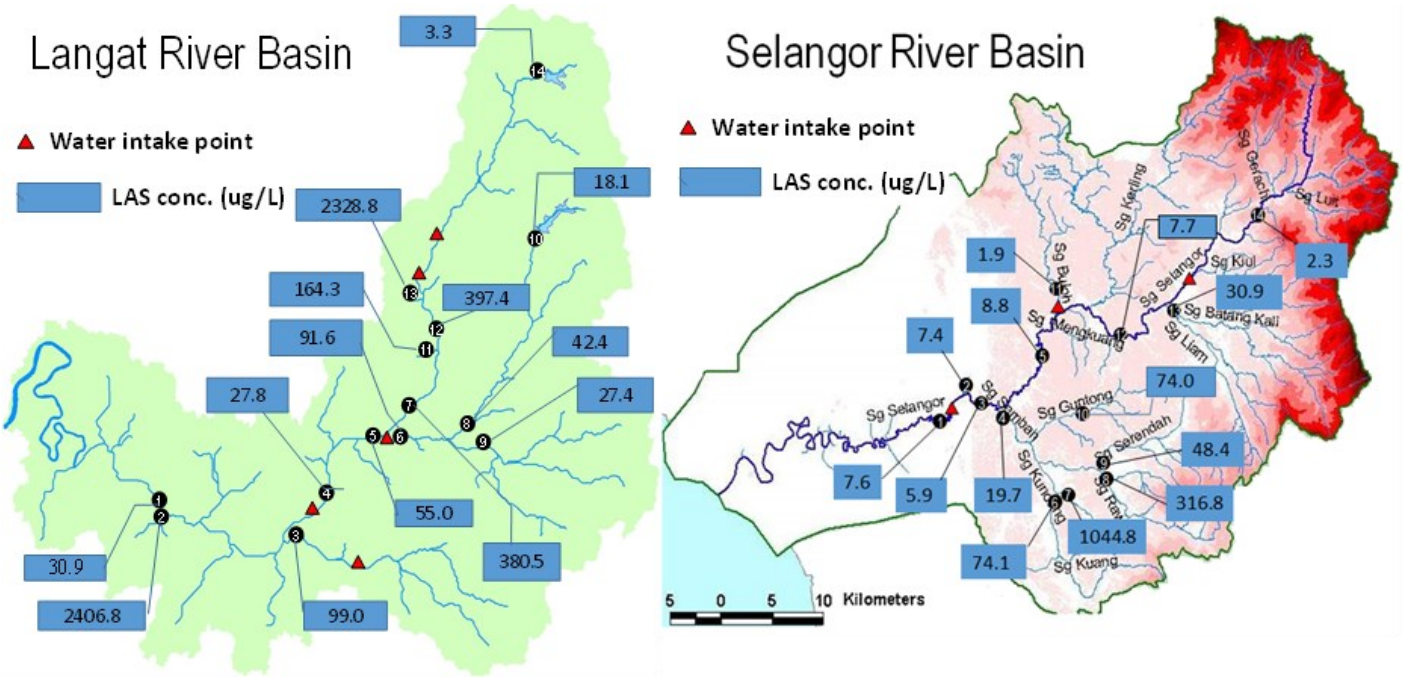


Fig 3. LAS concentration in Langat and Selangor river basin

Figure 3 shows the LAS concentration of Langat and Selangor river basin. It was found that the LAS concentration was significantly different among the sampling sites. Urban areas were highly contaminated as Banting (site 2) and Balakong (site 13) in Langat as well as Rawang (site 7) in Selangor were detected at more than 1000 ug/L. On the other hand, upstream sites showed at negligible level. This is probably because these urban sites are close to wholesale market, residential and/or restaurant area where highly polluted wastewater is discharged without treatment. Compared to Japanese river where LAS concentration is generally from several concentrations in Malaysia was significantly higher.

There is an index to evaluate environmental impacts of chemical substances: predicted no effect concentration (PNEC). We found that the average of alkyl chain was 11.4 in Langat and 11.5 in Selangor river basin. According to Akiko Yamamoto *et al*., (2010)[1)], PNEC calculated from the average alkyl chain in Langat and Selangor river basin is calculated 480 ug/L and 440 ug/L, respectively. Compared to the observed data (Figure 3), LAS concentrations in highly polluted sites largely exceeded the PNEC. Therefore, it is suggested that the LAS contamination in both river basins could cause adverse effects to aquatic species.

Reference

[1)] Akiko Yamamoto *et al*., Journal of Japan Society on Water Environment, 33, No.1 1-10 (2010)

Conclusions and Future Plan

In this study, it was shown that LAS concentration in Langat and Selangor river basin was higher than PNEC. The pollution source of LAS was probably from residential and/or restaurant wastewater as LAS was highly detected at populated sites. To reduce LAS contamination in the environment, sewer line should be built and transferred to sewage treatment plants as LAS can be decomposed by biological treatment. Furthermore, it is recommended to promote other surfactants to be used which are more eco-friendly.

In future prospective study, I plan to use geographic information system (GIS) to simulate LAS pollution in both river basins for identifying possible factors which cause the pollution such as population. Furthermore, I will attempt to utilize and develop LAS as an indicator which can suggest pollution source and/or level in water environment.

Shared values as a driver for Heartware in Integrated Watershed Management: Translational Research at Mukim Pasangan, Kuala Selangor

Mukim Pasangan, Selangor River Watershed, MALAYSIA

Dr. Zeeda Fatimah Mohamad
Department of Science & Technology,
Faculty of Science,
University of Malaya

Ms. Siti Norasiah Abd Kadir
Department of Science & Technology,
Faculty of Science,
University of Malaya

Mr. Affan Nasaruddin
Department of Science & Technology,
Faculty of Science,
University of Malaya

Introduction

The governance of Integrated Water Management (IWM) can be defined more inclusively as a gradual, continuous and holistic process of short-, medium- and long-term decision making that takes into consideration the ongoing conflicts, competition and resolutions between various groups that have a stake on a watershed. A key element within this inclusive approach of governance is its increasing recognition in dealing with "Heartware"- as a process of mediating different prioritization of values placed on the watershed by different stakeholders. Therefore, a translational research is designed as an immediate response to address these needs by translating the shared values in IWM acquired from the selected group, i.e., the youth and Muslim community of Mukim Pasangan, into various outreach and capacity building programmes aimed to empower the community in creating awareness of the importance of managing water resources. This research also focuses on documenting these shared values into an affordable coffee table book to bring back the aspirational memories of Selangor River to young adults and youth, and to enhance the Heartware of the community for IWM.

Objectives

*To introduce the idea of Heartware in the framework of water management thinking in the community of Mukim Pasangan.

*To "re-enchant" the stakeholders, local community and youth within a local watershed community in Mukim Pasangan by helping to set-up Heartware platforms (Kelab Alami KAWA, Rakan Alam Sekitar Masjid and coffee table book) for community participation and contribution in the IWM of Selangor River.

Messages from Supervisor (*Dr. Zeeda Fatimah Mohamad*)

This Heartware research project is a wonderful on-going learning experience for ACP researchers in exploring the ways in which "shared local values" can be a motivating factor for heartware. Heartware is defined here as the collective willingness of different stakeholders to continuously "cooperate" in solving complex long-term problems related to IWM. Inspired by some of the lesson in Japan, the research started with a yearlong exploration in identifying and prioritizing the shared values of a local community in Sungai Selangor, followed by a year of translational research that were designed based on these findings. For this research, we applied the appreciative inquiry (AI) approach as a proactive strategy to uncover elements of shared values within the community. Instead of starting with problems, the AI framework known as the "The 4D Model" starts by appreciating the process of "Discovery" – where researchers try discover the best moments and memories in the history of the community and its people. The second stage "Dreaming", builds on these exceptional life moments to envision what the community could be in the future. Then the framework moves to the more practical phase of "Designing" the future envisioned by the community themselves, and finally, to agreeing on each person's role for the "Delivery" phase. In this way, the AI approach helps a community to "journey into the future, while carrying the best parts of the past". This report will describe the three translational research that have been implemented in this research, led by our young scientists – Siti Norasiah Abd Kadir (Stakeholder re-enchantment via coffee table book), Affan Nasaruddin (Cultivation of citizen science via a *Kelab Alami Kawa*) and Mohd Noor Musa (Reviving Islamic ethic on water conservation via *Program Alam Sekitar Masjid).*

(a) Learning how to mendayung (row a sampan) proves to be a challenging tasks. Pakcik Saidon (left) and his family has been working as a rower for three generations! - Asiah
(b) Sharing session with local community and stakeholders about "water and values". - Mohd Noor
(c) "Ringan sama dijinjing, berat sama dipikul" (helping one another). Our reseacher helping a local carry the nipah leaves from the riverbanks of Selangor River. - Affan

Stakeholder re-enchantment via coffee table book

The tale of Mukim Pasangan, its livelihood, the uniqueness of riverine community and how they value their natural surrounding is best represented in the form of a coffee table book. Heart-warming human-nature relationship stories from the past, local traditions and current conservation efforts can be used as a 'tool' to inspire the hearts of the community and increase long-term stakeholder collaboration in the protection of Selangor River.

Cultivation of citizen science via Kelab Alami Kawa

A citizen science initiative to engage and educate the village youth of Mukim Pasangan, Kuala Selangor about their watershed habitat and its ecotourism values. This club is part of the Kelab Alami Network, originally pioneered at the marine community of Mukim Tanjung Kupang, Johor by community activists Shalan Jum'at and Serina Rahman. The Youth Rangers of Kelab Alami KAWA are being trained as local guides cum young scientists that are able to conduct simple scientific research and explain about the interesting places around the village, especially the watershed habitats (river and mangrove). The activities of the club are currently funded by the CSR division of Hartalega (a local glove manufacturing company) and supported by UMCares, University of Malaya's community and sustainability centre. This initiative is an interesting experiment in using citizen science for increasing the heartware of a watershed area.

Documenting on the method of thatching atap nipah (nipah roofing) as guided by the locals. - Dr. Zeeda

Remarks

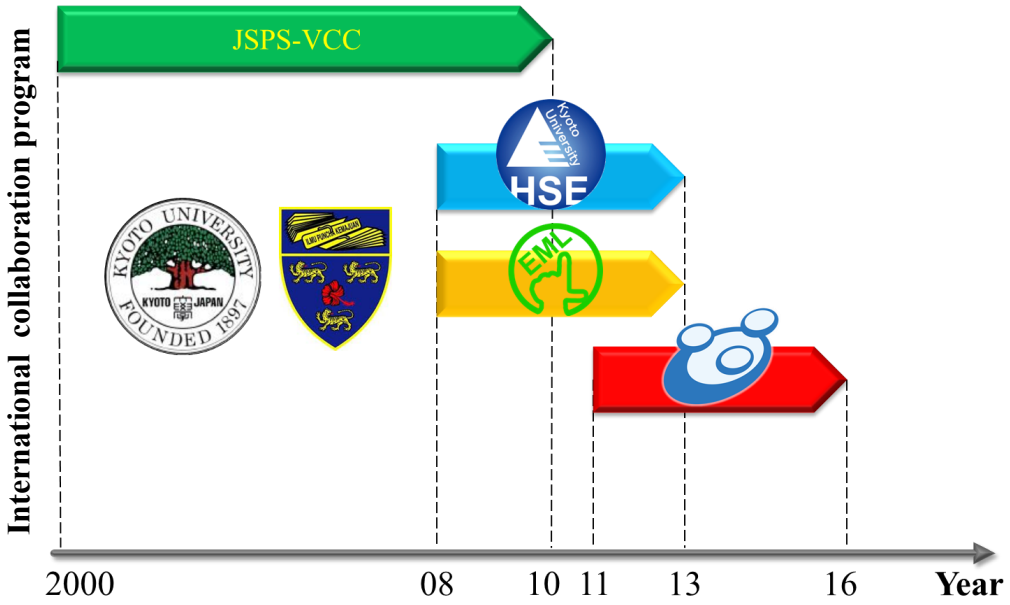
"*This research would not have been possible without the wonderful guidance, exposure, support advise and mentoring by the following ACP members: Prof Masahisa Nakamura (and his colleagues in ILEC), Prof Azizan Baharuddin, Prof Nik Meriam Nik Sulaiman, Prof. Yoshihisa Shimizu, Dr. Nobumitsu Sakai, Assoc. Prof. Dr. Wan Mohd Yusof Wan Chik, Dr Noor Zalina Mahmood, Prof Jamilah Mohamad, En. Azizi Abu Bakar, Dr Sharina Abd. Halim and many others. We would also like to acknowledge the University of Malaya Sustainability Science Research Cluster for their belief in this rather eclectic research and generously providing the needed research funds. Special recognition to student volunteers, Mohammad Shahrul Amin Mohd Salleh and Mohammad Redhza Rasidi, for assisting us in data collection and analysis. Finally, our utmost appreciation to the watershed community of Mukim Pasangan, Sungai Selangor for welcoming us to test our ideas with them – and to all the watershed communities that we have visited in Japan for inspiring us to embark into this project in the first place***"***

Reviving Islamic ethic on water conservation via the Rakan Alam Sekitar Masjid programme

An outreach programme aimed at developing human capital on water governance among the Muslim community of Mukim Pasangan, using the masjid (mosque) as the main institutional platform. The main target groups include the ahli jawatankuasa masjid (mosque commitee) the Penghulu (sub-district headman), ketua kampungs (village headmen), muslimat masjid (the women's affairs section of the mosque and remaja masjid (the youth section of the mosque). Through theoretical and practical training, the programme aims to increase knowledge and create awareness on the importance of managing water resources as one of the communal obligatory duty for Muslims (fard al-kifayah). We hope this programme could strengthen the implementation of Islamic religious ethics with regards to the conservation of water, and increase heartware contribution by Muslim communities in IWM.

Conclusion and Future Plan

Based on the appreciative inquiry approach - what began as a "discovery" on what we can appreciate in Mukim Pasangan and "dreaming" or imagining of what might be there, we have now ended up with "designing" on what can be done. The coffee table book, Kelab Alami KAWA and Rakan Alam Sekitar Masjid is part of our designing stage to encourage and re-enchant the communities for enhancing their participation in IWM. In the future, it is our aspiration that this research will be able to help "deliver" a more wholesome participation by the community in taking care of the Selangor River.



Programs and its duration under international collaboration between Kyoto University and University of Malaya

Program Contact Information

Asian Core program:
Research Center for Environmental Quality Management
Kyoto University
1-2 Yumihama, Otsu 520-0811, JAPAN
E-mail: shimizu@biwa.eqc.kyoto-u.ac.jp
Phone: +81-77-527-6221
Fax: +81-77-524-9869

University of Malaya-Kyoto University Secretariat Office Contact Information

University of Malaya-Kyoto University Secretariat
Level 6,
Research Management and Innovation Complex (RMIC),
University of Malaya
50603, Kuala Lumpur MALAYSIA.
E-mail: gcoe_acp@um.edu.my
Phone: +603-7967 4635 **Fax**: +603-7967 7813
Web: http://gcoe-acp.um.edu.my